UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/541,011	12/20/2005	Ashutosh Joshi	0-05-106	9060

42009 7590 06/14/2010

KEVIN D. MCCARTHY
ROACH BROWN MCCARTHY & GRUBER, P.C.
424 MAIN STREET
1920 LIBERTY BUILDING
BUFFALO, NY 14202

EXAMINER	
WONG, EDNA	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
06/14/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/541,011	JOSHI ET AL.	
	Examiner	Art Unit	
	EDNA WONG	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 May 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,5,8,11-16,19 and 20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,5,8,11-16,19 and 20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 10, 2010 has been entered.

This is in response to the Amendment dated May 10, 2010. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office Action.

Response to Arguments

Claim Rejections - 35 USC § 112

Claims **1, 4-6, 8 and 11-16** have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The rejection of claims 1, 4-6, 8 and 11-16 under 35 U.S.C. 112, second paragraph, has been withdrawn in view of Applicants' amendment.

Claim Rejections - 35 USC § 103

Claims **1, 4-6, 8 and 11-16** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **CS 274995** ('995) in combination with **Nakamura** (US Patent No. 6,194,821 B1) and **Jen et al.** ("Determination of Hydroxyl Radicals in an Advanced Oxidation Process with Salicylic Acid Trapping and Liquid Chromatography", *J. of Chrom. A*, Vol. 796 (1998), pp. 283-288).

The rejection of claims 1, 4-6, 8 and 11-16 under 35 U.S.C. 103(a) as being unpatentable over CS 274995 ('995) in combination with Nakamura and Jen et al. has been withdrawn in view of the new grounds of rejection.

Response to Amendment

Claim Rejections - 35 USC § 112

I. Claim **20** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 20

line 1, the word "comprising" does not further limit what the method already comprises as recited in claim 1, line 4. The subsequent mention of an element is to be modified by the definite article "further" to thereby make the latter mention(s) of the element unequivocally further limiting to its earlier recitation.

line 1, it appears that the "hydrogen peroxide" is the same as the hydrogen peroxide recited in claim 1, line 3. However, it is unclear from the claim language as to whether it is. The subsequent mention of an element is to be modified by the definite article "the", "said" or "the said," thereby making the latter mention(s) of the element unequivocally referable to its earlier recitation.

lines 1-2, it appears that the "sea water" is the same as the liquid aqueous biocidal mixture containing hydrogen peroxide (H_2O_2) recited in claim 1, lines 2-3. However, it is unclear from the claim language as to whether it is.

II. Claim **20** is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: between the method steps of i) to v) and the step of adding hydrogen peroxide to sea water, which sea water is intended to serve as ballast water.

The method step recited in claim 20 is not modifying any element earlier recited in the method steps of i) to v) recited in claim 1. Thus, it is unclear from the claim language how the method step recited in claim 20 fits into the method recited in claim 1.

III. Claim **20** is rejected under 35 U.S.C. 112, second paragraph, as being

incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: between the liquid aqueous biocidal mixture containing hydrogen peroxide (H_2O_2) and the sea water.

It is unclear from the claim language how the method treats both the liquid aqueous biocidal mixture containing hydrogen peroxide (H_2O_2) recited in claim 1 and the sea water recited in claim 20.

Claim Rejections - 35 USC § 103

I. Claims **1, 5, 8 and 11-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Coury et al.** (US Patent No. 6,361,697 B1) in view of **Giamello et al.** ("Evidence of Stable Hydroxyl Radicals and Other Oxygen Radicals Species Generated by Interaction of Hydrogen Peroxide with Magnesium Oxide", *J. Phys. Chem.* (1993), Vol. 97, pp. 5735-5740).

Coury teaches a method for enhancing the generation of hydroxyl radicals (OH*), at ambient temperature, in a liquid aqueous biocidal mixture containing hydrogen peroxide (H_2O_2) [= the contaminated water **902** and hydrogen peroxide **905**], wherein the hydrogen peroxide has an initial concentration (col. 17, lines 39-41; and col. 24, lines 20-24), said method comprising the following steps:

i) supplying oxygen (O_2) to said mixture by injection of oxygen or air (= venture **912**, which mixes the water with fresh ozone and/or oxygen gas **915**) [col. 24,

lines 45-46; and Fig. 9];

ii) supplying suspended small catalyst particles **44** (col. 14, lines 26-29) to said mixture at a concentration (= the resulting "suspension" of small catalyst particles in the lower portions of the upper media zone near the conical coupling also tends to produce a high concentration of radicals in the water, favorably increasing the rate of decontamination of the water) [col. 17, line 64 to col. 18, line 5; and Fig. 8];

iii) adjusting the pH of said mixture to a value of from 7.2 to 9.7 (= adjusting the pH of the fluid F to about pH 7 to pH 10) [col. 13, lines 40-41];

iv) irradiating said mixture with UV light having a wavelength of from 190 to 390 nm (= an assortment of free radical inducers can be used, such as, but not limited to, *UV*, manganese dioxide, high pH, TiO_2, to force the initiation step) [col. 14, lines 26-29]; and

v) mixing said mixture (= contaminated water, *intimately intermixed* with hydrogen peroxide and microinized gas, flows downward in vessel **908**) [col. 24, lines 65-67].

The oxygen is supplied to saturation (= supersaturation increases the concentration of ozone and oxygen) [col. 9, lines 14-22].

The desired amount of hydroxyl radicals is a predetermined quantity (= to increase the absolute concentration of free radicals to create conditions for a chain reaction by insuring excess of radicals over terminators) [col. 13, lines 1-3].

The method of Coury differs from the instant invention because Coury does not disclose the following:

a. Wherein *the hydrogen peroxide* has an initial concentration of from 2 to 250 ppm, as recited in claim ***1***.

b. Wherein said initial concentration of *hydrogen peroxide* is from 10 to 50 ppm, as recited in claim ***8***.

Coury teaches that peroxide, H_2O_2, in the form of a solution, may also be added in small doses to the water being purified, to aid the formation of free radicals in the water (col. 18, lines 41-50; and col. 24, lines 1-7).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the hydrogen peroxide described by Coury with wherein the hydrogen peroxide has an initial concentration of from 2 to 250 ppm; and wherein said initial concentration of hydrogen peroxide is from 10 to 50 ppm because the initial concentration of the hydrogen peroxide is a result-effective variable and one having ordinary skill in the art has the skill to calculate the initial concentration of the hydrogen peroxide that would have determined the success of the desired reaction to occur, i.e., to aid the formation of free radicals in the water (MPEP § 2141.03 and § 2144.05).

c. Wherein the suspended small catalyst particles is magnesium oxide, as recited in claim ***1***.

Coury teaches that the free radical initiator can be *one of several types of well known to those skill in the art* (col. 7, lines 56-57).

The implication of this unexpected finding is that any economic mix of free radical sources, such as ozone or peroxide, can be used. Also, *an assortment of free radical inducers can be used, such as, but not limited to*, UV, manganese dioxide, high pH, TiO_2, to force the initiation step. For the present invention a catalytic step with a residence time of only 3 seconds is ideal. Any further initiation provides excess self-termination. At a catalytic residence time above 12 seconds, no free ozone was generated and subsequent fouling was found. At bed velocities below about 0.2 in/second., catalyst fouling was found and loss of catalyst resulted. At bed velocities above 0.4 in/second., catalyst loss by over-fluidization was found. For the present invention, the optimum was between 0.25 and 0.34 in/second (col. 14, lines 24-38).

Other like media could be readily used. Even though the particulate material preferably acts as a catalyst to increase the speed at which chemical reactions occur within the containers, the particulate material does not affect the equilibrium of the reactions (col. 16, lines 35-39).

Like Coury, ***Giamello*** teaches the formation of free radicals. Giamello teaches that the interaction of hydrogen peroxide with magnesium oxide at ambient temperature leads to the decomposition of the molecule and to the parallel transformation of the oxide into the corresponding peroxide. During the process three radical species are generated and subsequently trapped into the solid peroxide matrix giving rise to an intense and reproducible EPR spectrum. The observed radical species are the hydroxyl OH radical, the O^-, and the O_2^- radical ions (page 5740, "Conclusions").

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the suspended small catalyst particles described by Coury with wherein the suspended small catalyst particles is magnesium oxide because the interaction of hydrogen peroxide with magnesium oxide at ambient

temperature would have led to the decomposition of hydrogen peroxide and to the parallel transformation of the oxide into the corresponding peroxide, and during the process, three radical species: the hydroxyl OH radical, the O^-, and the O_2^- radical ions, would have been generated and subsequently trapped into the solid peroxide matrix as taught by Giamello (page 5739, left column; and page 5740, "Conclusions").

Using magnesium oxide as the free radical inducer in the method of Coury would have accomplished what Coury had proposed to do. It has been held that the selection of a known material based on its suitability for its intended use supports a *prima facie* obviousness determination (MPEP § 2144.06 and § 2144.07).

d. Wherein *the magnesium oxide* is at a concentration of from 2 ppm to 250 ppm, as recited in claim ***1***.

e. Wherein said concentration of *magnesium oxide* is from 10 to 50 ppm, as recited in claim ***8***.

Coury teaches that other like *media* could be readily used. Even though the particulate material *preferably acts as a catalyst to increase the speed at which chemical reactions occur* within the containers, the particulate material does not affect the equilibrium of the reactions (col. 16, lines 35-39).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the magnesium oxide described by the Coury combination with wherein the magnesium oxide is at a concentration of from 2 ppm to

250 ppm; and wherein said concentration of magnesium oxide is from 10 to 50 ppm because the concentration of magnesium oxide is a result-effective variable and one having ordinary skill in the art has the skill to calculate the concentration of magnesium oxide that would have determined the success of the desired reaction to occur, i.e., to increase the speed at which chemical reactions occur (MPEP § 2141.03 and § 2144.05).

f. Wherein said mixing is carried out for *a period of time* sufficient to generate the desired amount of hydroxyl radicals, as recited in claim ***11***.

g. Wherein *said period* lasts from 3 seconds to 5 hours, as recited in claim ***13***.

h. Wherein *said period* lasts from 30 second to 100 minutes, as recited in claim ***14***.

i. Wherein *said period* lasts more than 5 hours, as recited in claim ***15***.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the mixing described by Coury with (f) to (i) above because:

(i) The period of time for the mixing is a result-effective variable and one having ordinary skill in the art has the skill to calculate the period of time for the mixing that would have determined the success of the desired reaction to occur (MPEP § 2141.03 and § 2144.05).

The mixing would have ensured that all of the reactants contacted each other and reacted with each other.

(ii) It is within the level of ordinary skill in the art to operate a process continuously. *In re Dilnot* 138 USPQ 248; *In re Korpi* 73 USPQ 229; *In re Lincoln* 53 USPQ 51 (MPEP § 2144.04(V)(E)).

j. Wherein *said desired amount* of hydroxyl radicals is an amount sufficient to reach a required biocidal effect in the mixture, as recited in claim ***12***.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the desired amount of hydroxyl radicals by Coury with wherein said desired amount of hydroxyl radicals is an amount sufficient to reach a required biocidal effect in the mixture because the Applicant has a different reason for, or advantage resulting from doing what the prior art relied upon has suggested, it is noted that it is well settled that this is not demonstrative of nonobviousness. *In re Kronig* 190 USPQ 425, 428 (CCPA 1976); *In re Linter* 173 USPQ 560 (CCPA 1972); the prior art motivation or advantage may be different than that of Applicants while still supporting a conclusion of obviousness. *In re Wiseman* 201 USPQ 658 (CCPA 1979); *Ex parte Obiaya* 227 USPQ 58 (Bd. of App. 1985) and MPEP § 2144.

II. Claim **19** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Coury et al.** (US Patent No. 6,361,697 B1) in view of **Giamello et al.** ("Evidence of Stable

Hydroxyl Radicals and Other Oxygen Radicals Species Generated by Interaction of Hydrogen Peroxide with Magnesium Oxide", *J. Phys. Chem.* (1993), Vol. 97, pp. 5735-5740) as applied to claims 1, 5, 8 and 11-16 above, and further in view of **Jen et al.** ("Determination of Hydroxyl Radicals in an Advanced Oxidation Process with Salicylic Acid Trapping and Liquid Chromatography", *J. of Chrom. A*, Vol. 796 (1998), pp. 283-288).

Coury and Giamello are as applied above and incorporated herein.

The method of Coury differs from the instant invention because Coury does not disclose wherein generated radicals are quantified by a chemical method comprising reacting the hydroxyl radicals with salicylic acid, as recited in claim ***19***.

Jen teaches using liquid chromatography indirectly to detect hydroxyl radicals after a trapping reaction with salicylic acid in an advanced oxidation process (abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the generated radicals described by Coury with wherein generated radicals are quantified by a chemical method comprising reacting the hydroxyl radicals with salicylic acid because it is conventional in an advanced oxidation process to trap hydroxyl radicals using salicylic acid as taught by Jen (abstract).

III. Claim **20** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Coury et al.** (US Patent No. 6,361,697 B1) in view of **Giamello et al.** ("Evidence of Stable Hydroxyl Radicals and Other Oxygen Radicals Species Generated by Interaction of

Hydrogen Peroxide with Magnesium Oxide", *J. Phys. Chem.* (1993), Vol. 97, pp. 5735-5740) as applied to claims 1, 5, 8 and 11-16 above, and further in view of **Zhou et al.** ("Determination of Photochemically Produced Hydroxyl Radicals in Seawater and Freshwater", *Marine Chemistry* (1990), Vol. 30, pp. 71-88).

Coury and Giamello are as applied above and incorporated herein.

The method of Coury differs from the instant invention because Coury does not disclose wherein the method comprises adding hydrogen peroxide to *sea water*, which sea water is intended to serve as ballast water, as recited in claim ***20***.

Coury teaches that *any economic mix of free radical sources, such as ozone or peroxide, can be used* (col. 14, lines 24-26). The instant claimed invention can be practiced on any aqueous stream which contains an unacceptable level of impurities, such as suspended matter, organics, dissolved mineral matter, dioxins, microorganisms, and color bodies (col. 20, lines 59-62; and col. 21, lines 41-56).

Like Coury, ***Zhou*** teaches the formation of free radicals. Zhou teaches that the highly reactive hydroxyl radical (OH) is photochemically formed in seawater (page 71, abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method described by Coury by adding hydrogen peroxide to sea water because sea water would have been a free radical source for hydroxyl radicals as taught by Zhou (page 71, abstract).

As to "which sea water is intended to serve as ballast water", the reason or

motivation to modify the reference may often suggest what the inventor has done, but for a different purpose or to solve a different problem. It is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by the Applicants. *In re Linter* 458 F.2d 1013, 173 USPQ 560 (CCPA 1972); *In re Dillon* 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir. 1990), *cert. denied*, 500 US 904 (1991) [MPEP § 2144].

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EDNA WONG whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Edna Wong/
Primary Examiner
Art Unit 1795

EW
June 10, 2010